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VOLUME IV

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only and not presented at Conference)

DIVIDE & DEFEAT - THE POWER TO CONTROL THE ENVIRONMENT

Notes for a paper delivered to
"HAMILTON ENVIRONMENT 80",
Friday, November 14, 1980
by Herman Turkstra, Barrister

I needed a perspective from which to focus these remarks. I decided to ask you to come with me, in your imagination, for a ride around Hamilton Harbour on the new harbour cruise boat, once in the daytime and once after dark.

We step on the cruise boat at the Burlington Bridge on land controlled by the Federal Government. We cruise across a harbour that is regulated in part by the Hamilton Harbour Commissioners under Federal legislation, and in part by the Hamilton Region Conservation Authority under Provincial jurisdiction, past boats regulated by the Federal Government, over fish regulated by the Federal Government, past industries regulated by the Provincial Government, through imaginary zoning lines regulated by the City of Hamilton on one side and the City of Burlington on the other, supervised by the planning staffs and planning committees of the Hamilton-Wentworth Region and the Halton Region and by the Minister of Housing for the Province of Ontario and by the Ontario Municipal Board.

The quality of the water we travel over on our imaginary trip is the result of what the Province allows the cities and their industries to dump in the bay. The quality of the air is the result of a density of polluters that the cities' zoning bylaws allow to operate below the escarpment and the extent to which the Provincial Government and the City permit them to dump refuse in the air.

I have taken this boat ride many times during the past summer and the summer before. I have stood on the Burlington side of the harbour and looked at the City during the daylight hours and after dark, on weekdays and weekends.

Looking at the city from the middle of the bay, I have received one major and persistent impression time after time. There is a marked difference between how the east end of the city looks and how the center and west end look.

Standing on a boat in the center of the harbour I can often see clearly to the escarpment, details of the trees, the roads going up the escarpment and the lights at night; But only west of Sherman Avenue. East of Sherman Avenue the lights of the streets are blotted out, not once, but regularly.

Sitting on the water at about Wellington Street, you can see the escarpment face clearly all the way to Ancaster, but you often cannot see the escarpment at all east of Sherman Avenue. Speaking without scientific measurements, it constantly appears that the density of the garbage in the air over the east end of Hamilton is more severe on weekends and at night than it is in the daytime. Often the density seems to vary with the working hours of ministry inspectors. This is an impression shared by many people who look at the city from the water.

If, after you complete your tour of Hamilton Harbour, you walk on the pier on the north side of the Burlington Canal out to the Lake Ontario tip of that pier, you will have a fascinating experience. Stand facing the Lake. On your left side you will see the water that has come along the Burlington beach, reasonably

clear, normally blue in colour and with a transparency that allows you to see a reasonable depth to the bottom.

Ten feet away on the other side of the pier, is the water leaving Hamilton Harbour and going out to the Lake. That water is generally dark brown, ugly, miserable and a continuous, unremitting, hour after hour, day after day, month after month, disgrace.

The pollution problems of the city dominate its personality across Ontario. They affect the way new industries see us. They characterize us in a way that prevents us from changing the complexion of our industrial base. One day, when our present major primary producer gets Nanticoke all operational, the move out of Hamilton will begin. And we will be left with the worst case of post partum blues imaginable.

Throughout any discussions about the environment in Hamilton, there will be talk of how monitoring devices have clearly demonstrated that the various levels of government and the industries and everybody else have made great strides in cleaning up our air and water.

My own perception is that people that live and work in the area south of Burlington Street and east of Sherman Avenue should long ago have risen up in revolt and attacked their leaders.

In the times of the first Queen Elizabeth it was common to walk to the front of your house in the morning and throw a bucket of night water out the window onto the street.

That practice has ceased.

But the practice of dumping ever-increasing amounts of dirt into the air and the water has not stopped, and this paper is designed to review the approaches that are available to ordinary citizens to do something about their environment.

I propose to deal with the subject matter in the following three divisions. The first will be a catalogue of the powers of the various levels of government to deal with environmental problems. There is little sense in trying to influence the political machinery unless you know who has the true control. This catalogue should show you why the debate about our constitution is more important than you think and why the division of powers actually mean something.

The second part will be a review of the power of our common law and our courts to help citizens who are directly faced with environmental hazards. I hope that when that review is complete, you will understand that discussions between lawyers, legislatures and law professors about court costs, contingent fees, class actions and punitive damages are issues of real importance to the people who live six and eight blocks away from a massive polluter, or who circle the Ottawa Street dump.

Thirdly, I will discuss briefly political techniques that are available and that have some hope of success.

Let me turn to the catalogue of powers.

Our constitution, the British North America Act, divides the power to govern between the Federal Government and the Provincial Government. It was drafted before environmental concerns of the nature we face today were even thought about. The basic

structure of our existing constitution is that one list of powers is given to the Provincial Government and another list of powers is given to the Federal Government. The direct control of the environment is not specified. As a result, the power of the Provincial and Federal Governments to control the environment have been inferred over the years from a number of other powers given to each level of government.

Municipalities, having been created by the Provincial Government, are limited both in the scope of the powers given to them by the Provincial Government and by the powers given to the Provincial Government under the constitution. The same can be said for such bodies as the Hamilton Region Conservation Authority.

The Harbour Commissioners on the other hand, as a creature of the Federal Government, are answerable to the Federal Government, and their powers are limited, both by the delegation of powers to them by the Federal Government and the Federal Government's own authority under the constitution.

It follows that real amendment to our constitution will have to come to grips with the question of who controls the environment. And as long as that issue is dealt with by inference from other categories of jurisdiction created in our historic constitution, there will continue to be loopholes, overlapping jurisdiction, confusion of responsibility, and difficulties of laying true political responsibility on the head of one clearly defined governmental body.

The jurisdiction to control the pollution of water is a good place to start. As the Spencer Creek rises in the Beverly

Swamp and meanders through the Township of Flamborough down to the Town of Dundas and finally into Cootes Paradise, it constitutes clearly a Provincial resource over which the Federal Government has no control. Natural resources are allocated under the Constitution to the Provinces.

It is for this reason that when the Harbour Commissioners were constituted many years ago, the rights over Cootes Paradise were ceded by the City of Hamilton and by the Province of Ontario to the Federal Harbour Commissioners.

As the water from the Spencer Creek flows through the Desjardin Canal, under Dundurn Street by the High Level Bridge and enters Burlington Bay, it becomes a navigable body of water and starts to become part of a harbour which is controlled by the Federal Government. Fisheries and navigable waters are regulated by the Federal Government.

Because of this overlapping jurisdiction, there is now very serious litigation in the Province of British Columbia, between the Province of British Columbia and the Federal Government over who controls the levels of water in a stream that both carries away the effluent from a major industry and serves as the spawning ground for salmon. That litigation is a perfect example of the way in which the overlaps in jurisdiction can be used by polluters to delay effective orders. When the Federal Government issued an order as to the volume of water that was required to be passed down the stream, the industry refused to comply and brought an application supported by the Provincial British Columbia Government, that the Federal Government had no jurisdiction over the stream.

Once Spencer Creek gets into Hamilton Harbour, it becomes part of the navigation system of Canada and in the same way that the Welland Canal and St. Lawrence Seaway are controlled by the Federal Government, the Federal Government has some claim to control over what happens in the Hamilton Harbour. A vessel engaged in international trade, coming into Hamilton Harbour, bearing the traditional flag of Panama, will have its effluent regulated by the Federal Government. A municipality has been held not to have the power to control such a vessel by its anti-smoke by-law. An industry at the side of Hamilton Harbour will have its effluent regulated by the Provincial Government.

As long as that gap persists, each Government can say that it is not in full control of what is happening in the Harbour, and evade responsibility. If the Harbour Commissioners double the number of vessels coming into the Harbour, the Provincial Government has very little that they can say. If the City and the Provincial Government double the size of Dofasco on the shore, the Federal Government has little to say.

The traditional defence of multiple polluters is that no one can determine who is really responsible for the final mess. As long as there is a divided jurisdiction over the water in Hamilton Harbour, that divided responsibility makes it harder to pin the blame on any one agency.

If you had to assess who has the biggest clout, I would suggest that in the final analysis, the major responsibility over the water in Hamilton Harbour belongs to the Provincial Government, and the municipalities. It is for that reason that various Provincial

Ministers of the Environment have made a variety of public statements about effective control over Hamilton water quality in the Harbour and why orders have been made by the Provincial Government which are said to improve that quality. If they did not appear to be doing something, they might be embarrassed. Whether something has really been accomplished is for others to say.

Lest it be thought that the municipal governments have nothing to do with this, it is obvious that if one of the steel producers at the edge of the Harbour is allowed to double its size, then the amount of effluent going into the Harbour is going to be doubled even though the standards of pollution are maintained on an even level. One gallon of water with one part per thousand precipitate produces exactly half as much pollution as two gallons of water with one part per thousand precipitate. The ability to control the way in which land is used at the edge of the Harbour is very clearly given in the first instance to the City of Hamilton and the City of Burlington. Their action is subject to review by the Minister of Housing and ultimately the Ontario Cabinet, finally being subject to appeal to the Ontario Municipal Board. But the density of use on the shore of the Harbour is primarily the responsibility of the City of Hamilton. Zoning is a vital form of environmental control.

The control of water-borne garbage or sewage is relatively clear. Apart from discharges from vessels in the Bay, the responsibility for control of the discharge of storm and sanitary sewers in the Harbour rest with the municipal government. While there are standards imposed on the municipality by the Provincial

Government, the City Council and the Regional Council have a very direct responsibility for the degree to which the Bay is polluted by water-borne garbage. Like the householders of Queen Elizabeth, we still throw a lot of slops into the bay.

In these circumstances, it is a bit ridiculous that the major center for research of water quality in this area is owned by the Federal Government. The Canada Center for Inland Waters is operated by the junior partner in the syndicate that controls water pollution in Hamilton Harbour. If there were a real commitment on the part of the Province dealing with water pollution in this area, these are the kind of facilities that would have been established here years ago by the Province.

There are other constitutional powers that can be used to control the environment.

The control of health hazards is essentially a Provincial responsibility. That power can be used to control air and water pollution. The control over the criminal law is a Federal responsibility. Where conduct is dangerous to health, it is possible for the Federal Government to use its criminal law powers to control that type of conduct in the same way that the criminal law power is used to control false advertising.

If you fish off Bronte you will find that there is every indication from the signs posted on the side of Lake Ontario that the fish in that lake are clearly unsafe to eat. Whether that state of affairs has been reached because of industries along the Niagara River or whether it has been reached by virtue of what people of Hamilton, Grimsby, St. Catharines and all our cousins

feeding into Lake Ontario have been doing, the fact remains that we are dumping very large amounts of pollutants into Lake Ontario out of Hamilton Harbour and are contributing to the Lake's problems. That could be controlled by the Federal Government but it does not respond. Ask your local Federal Member of Parliament.

Provincial control has been kept largely to a minimum because the health hazards arising from long term water pollution are difficult to determine and there is in this day and age, very little direct concern about the poisoning of fish and wildlife.

The health hazards of air pollution, however, are more directly perceived and felt. When you look at the City from a distance you can see its air pollution level. When you hear the comparative pollution levels between the Cities of Hamilton and Toronto daily on the radio, you know that there is a problem. When you move to the city and your eye doctor tells you that many people have sore eyes for the first several weeks of coming to Hamilton until their systems adjust to the air pollution below the brow, you know there is a problem. When the paint lasts on your eaves-trough for 18 or 24 months, you know you have trouble. When the doctors dealing with the whole variety of lung disorders tell you that there is a problem you know that it is true. And if anything is to be done about it, it is important to understand who has control over air pollution.

There are some minor matters in this area that are regulated by the Federal Government. For example, the Federal Government has exclusive authority to deal with the way in which the C.N.R. and the C.P.R. operate. If it decides to let them run

with diesel engines through the heart of the City of Hamilton, then they will run through the City of Hamilton in whatever fashion the Federal Government decides. The same applies to transport trucks engaged in interprovincial trade and to carriers engaged in the interprovincial and international flow of passengers.

What is not commonly perceived as a Federal Government power is the way in which the Federal Government can influence spending patterns through its taxation and import power. Import duties or the absence of import duties, excise taxes or the absence of excise taxes can have a very real effect on what is or is not practical to bring into the country or to manufacture and sell here. Thus, if a wet scrubber is subject to a 15% import duty and an 11% Federal sales tax, it will make that scrubber a great deal less attractive than if those taxes are waived. The Federal Government can develop and pay for subsidy programmes if it wants to. There is a role for the Federal Government in facilitating the installation of anti-pollution devices. It is not high on that government's list of priorities.

The direct control over air pollution rests with the Provincial Government under the provincial power to control property and civil rights.

That power is exercised in a variety of ways. One is by the delegation to municipalities of a limited range of powers such as the right to say where the polluting industry will locate and the density that polluting industries will be allowed to develop to. Another is the common law administered by the courts, essentially a provincial law over which the Federal Government has little or no control.

The Municipal and Provincial Governments can have a direct influence on air pollution in this area by indirect means as well. For example, the conversion of all municipal vehicles to natural gas from the conventional gasoline or diesel fuel, would have a major impact on pollution levels in this city. The municipal transport system is a very heavy polluter in the downtown core. The extent to which there is a municipal commitment to alternate energy sources for vehicles other than diesel fuel and gasoline engines is a significant factor.

Municipalities have, even apart from their legislative powers, the ability to develop a leadership role as well as to set examples. A good example of this was the conversion of the City Hall heating system from bunker oil, class 2, with a high sulphur content, to natural gas some years ago.

When you are considering the direct power to control the smoke stacks of Hamilton, you are essentially, however, dealing with the power of the Provincial Government and that power is exercised in two forms. Firstly, by statute and regulation, and secondly by the common law.

The primary legislation in Ontario governing air pollution is the Environmental Protection Act, 1971. The essential principal of the Environmental Protection Act and similar legislation throughout the country is that it was billed as a response to the inadequacy of the common law courts to deal with major pollution problems. Under the Environmental Protection Act, the Minister of the Environment has the authority to make ministerial orders, which set the limits that polluters are permitted to dump garbage into

the air. It also deals with waste management, sewage disposal, litter and herbicides. The most outstanding recent example of the use of this Act was the order made against Inco, directing it to reduce its sulphur emissions radically over the next several years. Most of us believe that that order is probably a reflection of private government information that the hazards of acid rain are much greater than commonly perceived.

The major industries in Hamilton operate under similar orders. It is important to understand that as long as the industry complies with the terms of those orders, it cannot be prosecuted under the Environmental Protection Act, (Section 102.) As a consequence we see, under the Environmental Protection Act, the classical syndrome of the government regulators becoming the defenders and protectors of the very industry they were set up to regulate. Over a period of years, ministry officials responsible for setting these standards, developed very close contact with the industrial specialists in air pollution. What transpired is an ongoing dialogue over many years in which the neighbours and urban dwellers are not a part. A wise business will ask for an order under the Act. It becomes a shield against the public.

Negotiations between the industry and the ministry officials become, in effect, negotiations between the members of the same club, and as the orders are not the subject matter of debate in the provincial legislature, there is very little direct political accountability of any consequence for these orders.

The process of attempting to find out what's going on under the Act is remarkable difficult. By way of illustration,

I have attempted over a six month period to learn what exactly the Ministry of the Environment permits Baycoat to pass out of its exhaust pipes and into the air adjacent to the Queen Elizabeth Highway. I have not received that information in that six month period. I doubt if any member of the media in Hamilton has any idea of what the Ministry of the Environment has permitted the major industries of this city to pump into the air. About the only thing that we can perceive directly is that there seems to be on occasion a difference between the level of exhaust when the inspectors are at work during normal working hours and the level of exhaust at night and occasionally on Sundays. If the R.C.M.P. pursued the drug trade the way the inspectors pursue our industry, there would be no convictions for trafficking in Canada. The transfer of the control over the level of exhaust from open public debate to ministerial regulation has effectively removed the subject from public scrutiny and diffused concern and action. Only a dedicated environmentalist or a highly specialized member of the media will be able to get to the bottom of what is really happening in any kind of independent fashion.

This is another context in which Freedom of Information legislation is vital. The ministerial orders, research papers and inspectors reports should be public documents. As this province moves lamely forward toward a freedom of information bill, I ask you to keep an eye on the lobbies that will be opposed to broad access. Real freedom of information will kill the calm working relationship between industry and the civil service.

The final conclusion you are entitled to reach, is that the level of air pollution in the City of Hamilton is the direct personal responsibility of the Minister of the Environment for the Province of Ontario and to the extent that you are dissatisfied with it or wish to change it, he is the person that you should seek to influence. The committee of the Council of the City of Hamilton dealing with pollution has limited powers of public debate, inquiry and exposure of major problems, but virtually no direct power to control.

Let me conclude this part with the comments of a leading writer on this subject, Professor Dale Gibson:

"A federal railway has been ordered to obey a municipal by-law requiring it to clean ditches on its property. On the other hand, a municipal anti-noise by-law has been held not to apply to pleasure boats racing on a river within the municipality. Some judicial decisions on this problem are difficult to justify on any basis. One case held, for example, that a province cannot authorize searches in connection with alleged violations of provincial liquor laws that take place on board ship.

Most resource administrators seem to believe that the highly confusing constitutional division of responsibilities between federal and provincial governments presents insuperable impediments to sound planning, especially in the realm of water management, where so many matters that are functionally interdependent (fishing, navigation, power generation, irrigation, recreation, pollution, and so on) seem to be subject to divided jurisdiction. I have suggested elsewhere that water management by watershed agencies able to make provision for all aspects of water use is constitutionally feasible. This could be accomplished either co-operatively, by federal and provincial delegation of the necessary powers to a jointly established system of agencies, or perhaps even unilaterally, by exercise of the federal government's peace, order, and good government power, if the courts should be willing to extend the application of that clause beyond the situations to which it has already been applied."

I have not dealt with the right to private prosecutions under the Environmental Protection Act, nor with the Environmental Assessment Act, 1975. Prosecutions have worked occasionally but not significantly. The Environmental Assessment Act is designed for new projects. It may be possible to use the Environmental Assessment Act to test the new proposals of the Harbour Commissioners for landfill and industrial development and for the expansion of Dofasco.

By way of summary, I hope it will be apparent that we are labouring under a constitution designed before environmental problems were an issue, a constitution that has divided the jurisdiction to control the environment in a fashion that leaves many issues unclear and that the power of the Province in the major areas of air and water pollution has been funnelled into legislation giving control by ministerial order, a technique that removes the basic issues from debate and discussion and makes it difficult, if not impossible, to fix true political responsibility. In some respects, someone at the corner of Barton and Ottawa Streets trying to figure out what to do about the dirty air in his city, is like the young child who goes first to his mother to obtain approval for an activity and is told by his mother to see his father and by his father to see his mother and so on endlessly into the night. The difference is, of course, that while the mother and father are shifting from foot to foot on the issue of the environment, the air pollution and the water pollution continue.

I propose now to deal with the way in which the civil courts have a direct impact upon the issue of environmental concerns.

If you walk out your back door next Sunday morning with a white bag full of garbage and throw it over the fence onto your neighbour's lawn, you will bring yourself into the jurisdiction of the civil courts of this province. The common law as administered by the civil courts is essentially designed to preserve property rights. And so throwing your garbage on your neighbour's lawn is an act of trespass to your neighbour's rights of ownership, and if damages can be proven, you will be answerable for those damages.

It would be nice to think that if Stelco or Dofasco dump a whole lot of dust on your house or project an exhaust that passed your property that wilts the paint from your eavestrough. that they would be subject to a simple action in the courts in which their neighbours could collect damages.

The basic headings under which the common law has operated are trespass, nuisance and negligence. Trespass is a fairly straightforward concept. It involves unauthorized use of another person's property. Nuisance essentially involves one person using his property so that he bothers his neighbours and negligence is geared to activities that injure one's neighbours because one does not take adequate care.

These forms of legal action are very old. In 1611 the English Court of Kings Bench granted damages and an injunction to Plaintiffs whose air had been "infected and corrupted" by the odours from a defendant's hog sty. The law of nuisance can be used by individual property owners who are injured or by the Attorney General when the nuisance is said to be a public one.

"Godfrey v. Good Rich Refining Co. provides a good example. The plaintiff was owner of a large and attractively landscaped lake front country home located in a small village near the City of Toronto. The defendant company erected and commenced operation of an oil refinery on property some 2000 feet away. The refinery produced noxious odours, fumes and disturbing noises, as well as oil and soot which was deposited on the plaintiff's beach and on the lake waters.

In a nuisance action, the court considered evidence as to the nature, duration and intensity of the odours, fumes and soot, the nature of the neighbourhood, and other potential sources of pollution. It was held that the defendant was responsible for the emissions which materially interfered with the use and enjoyment of the plaintiff's property. Only a few major factories were located in the general area. The immediate vicinity of the plaintiff's residence was "an attractive residential district." The court found no evidence of depreciation in value of the property since no sale had been attempted. On the evidence the court considered that it was reasonable to infer that the technology was available to enable the refining operations to be carried on without creating a nuisance. Therefore "weighing all the circumstances" an immediate injunction was granted."

There are technical defences to these actions which would take an hour or more to cover. But the factual and practical problems of these cases are more important than the legal defences.

If you are just east of International Nickel in Sudbury and your trees are all wilting, there is very little doubt that you will be able to find out who is responsible. When you live in the east end of the City of Hamilton, and you find that your air is generally polluted, it becomes extremely difficult to determine which of the industries is responsible for the mess. In many areas of the law, where there are several people who are possible defendants, the courts have often lumped the judgement

against them all and have let the defendants sort out between themselves where the responsibility will be fixed. The classic case is that of a person who is injured when four people fire their shotguns at one time. Not knowing which shell it was that injured his leg, the plaintiff might still recover. Where the pollution comes from a variety of sources, it would be necessary to bring an action against all of the major sources.

Two major practical problems are the issues of legal fees and court costs.

If you live beside the Ottawa Street dump and you can demonstrate that the haulers of liquid waste were negligent in the way in which they handled the deposit of toxic waste in the dump, or if you can demonstrate that the dump operators were negligent in the way in which they controlled the dump, and if you can prove that you were damaged as a result, then you have a right to sue the operators and the haulers. If you live three blocks away from a factory in the east end of Hamilton and the smell from the factory is constantly wafting across your property and making it difficult for you to live there or is damaging to your property, you would probably have an action in nuisance. If you live adjacent to a factory and you can demonstrate that the dust from the factory is constantly landing on your property you probably have an action in nuisance and in trespass.

The problem is that in Ontario, the laws relating to nuisance, trespass and negligence appear to be of assistance on first reading, but their usefulness is overwhelmed by the approach of the Province of Ontario to such issues as contingent fees,

court costs and class actions.

It might be helpful to compare two situations. If you live in Hamilton, own your own home worth \$50,000 and work as a high school teacher earning perhaps \$20,000 a year, the possibility of being able to afford to bring an action against the Steel Company of Canada is very remote. In the first place, you must pay your lawyer, regardless of the outcome. For a full scale environmental trial, the expenses of witnesses, experts and your own lawyer, might run anywhere from \$10,000 - \$50,000. In the event that the action was lost, the court would probably order that you pay the costs of the Steel Company of Canada and again those costs could run anywhere from \$10,000 - \$30,000. For an ordinary citizen in this province to bring an action against a major corporation is, for all practical purposes, an impossibility.

It is possible for a very poor person, occasionally, to obtain some assistance from legal aid and it is obviously possible for the very rich to look after their own interests. But for the person of ordinary means in the Province of Ontario, access to the courts has generally been denied.

A comparison of the situation here with the situation in the United States is instructive. I chose to give you as an example, an early decision in the State of Oklahoma. I chose a 1959 decision because I want you to see how far we lag behind the United States. *Few v. Canadian Mining Co.* and several other Corporations reported in 267 Federal Reporter 2nd 785, was an action brought by a land owner for injury and damage sustained by reason of the defendant's strip company mining operations on his adjoining

land. The evidence sustained the finding that the conduct of the defendant strip miners amounted to a flagrant disregard of the plaintiff's right to the enjoyment of his property and justified an award of compensatory and exemplary damages. Getting punitive or exemplary damages in Ontario is an extremely difficult task. In the Few case, the court of appeal in Oklahoma upheld an award on the grounds of nuisance and reviewed the facts of the case which showed that the Defendant Corporations carried on their operations knowing throughout that there was a likelihood of damage to their neighbour, and as a result awarded exemplary damages.

I spoke to the lawyer who tried that case and he indicated that that award of exemplary damages had been the result of a trial in which he was paid on a contingency basis, which meant that the farmer who lived next to the strip mining company did not have to worry about court costs, because court costs are not awarded to successful litigants in most of the United States. Therefore, he did not have to worry about paying his lawyer if he didn't win.

Following the decision in the Few case, there were a number of other actions brought against similar companies by other plaintiffs who had access to contingent fee lawyers. The possibility of award of punitive damages makes it attractive for contingent fee lawyers to take these kind of cases, and little by little, the people who run the industries are made to realize that if they operate so as to injure their neighbours, it is going to become very expensive. If Mr. Few had lived in Ontario he would not have received his damages because the threat of legal fees and court costs

would have kept him out of court.

There is an active environmental bar in the United States engaged in contingent fee litigation on environmental issues. The conduct of class actions is generally easier in the United States. Punitive damages are awarded more easily in the United States, and court costs are rarely ordered against unsuccessful litigants there. All these facts make it easy to be a plaintiff in the United States. We have relegated our middle class to a no man's land in Ontario because our court rules on fees and costs favour the rich.

Lawyers on contingent fee retainers are a major force in product safety in the United States. They are a major force in the enforcement of securities legislation in the United States. They are a major force in consumer safety in the United States where double and triple damage awards are not unknown. The absence of the contingent fee retainer in the Province of Ontario has prevented the growth of a bar competent and capable of handling major environmental law suits for a large number of ordinary citizens.

What is left is the opportunity for a number of citizens to get together and pool their resources, occasionally to obtain help from legal aid, occasionally to have a fund raising drive to raise the necessary funds for litigation and to slowly, painfully and methodically put together a law suit that may provide some compensation for them. This is probably the only approach that will work, for example, for the people who live around the Ottawa Street dump. If those same people lived in Buffalo, the leverage available to them to recover their real damages would be multiplied immeasurably.

In summary: Common law remedies of nuisance, negligence and trespass when coupled with punitive or exemplary damages are a theoretical resource for people whose property is actually damaged by polluters. These remedies are severely constrained by this province's legal rules regarding court costs, class actions, exemplary damages, and contingent fees. The issue of court costs and contingent fee retainers will be debated in the provincial legislature in the new year as the Ontario Rules of Court are amended. These changes are a matter of interest to every person who has any concern about the environment.

The third division of this paper is a brief analysis of the means available to work within the political structure to effect a change in the environment.

Once you know who has all or part of the power to control the environment, you can start to try and get that political force to respond, if you want the environment to improve. On the other side of the fence, you know who to become friends with if you want to keep things as they are.

You should remember the most cynical aspect of politics. No level of government will respond because harm is being done. Government action swings behind the current fad of public concerns. And concerns do run in fads.

In the late 1960s, air and water pollution were attractive concerns. Some will remember this was the hey day of CHOP and Pollution Probe. These were matched with environmental action groups throughout the United States. The movers and shakers jumped on the bandwagon. The Province responded with the Environmental

Protection Act of 1971

In 1975 it was the airport. In 1978 it was nuclear energy. Last year it was asbestos. This year in Hamilton it is used cigarette smoke and men's magazines.

None of the peaks and vallies have to do with the actual harm being done. We live in times when issues become fashionable, intense and then burn out in about 12 to 18 months.

Hamilton's air pollution problems were not solved by the orders made under the 1971 Act. The special clean air mufflers put on the buses in the early 70s have not been replaced. City and provincial vehicles have not been converted to natural gas. No restraints have been placed on the expansion of the polluting industries. The trade union movement has done nothing to effectively use its clout to improve the quality of the environment. Perhaps in response to the prevailing fashion, some air quality monitors were stuck up in the air in several places in Hamilton. A number of orders were made. But the issue of healthy environment has died.

If you care about it you have to revive it. To revive it you have to find issues. The media have to inflame the issue. The movers and shakers have to get back on the band wagon and the next stage will flow from this. I think we are getting to that stage for the Ottawa Street dump.

What this process takes is a core of dedicated people who understand the process and who are prepared to work for a 10 year period to effect changes by moving in on the political forces when the right moment arrives, and sitting on the sidelines while the lulls go by. They need cash, they need organization, and they

need support; Like the Bruce Trail Association. Like trade unions. Like the right wing alliances that just changed the U.S. Senate.

The Non-Smokers Rights organization is a superb example. Mean, aggressive, impolite, threatening, vindictive, they stampeded Hamilton's Council. The Durand neighbourhood group is another success story. The Sierra Club is one which has weathered the ups and downs.

These examples point out that this city is desperately short of a hard core, long term professionally organized group dedicated to improving our environment and putting the heat on the political structure when the times are ripe, ready to help plaintiffs with law suits, ready to teach uninformed reporters what the facts are, ready to form a body of knowledge and muscle that the civil servants will worry about.

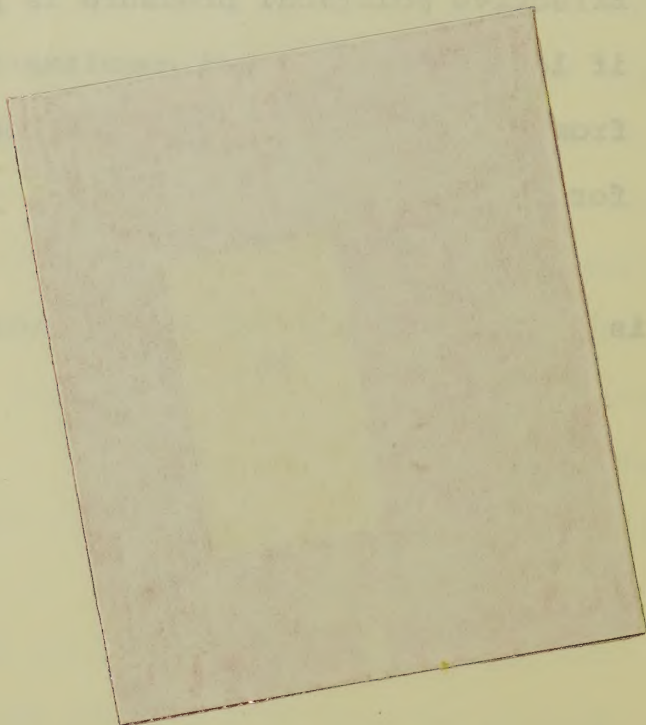
I draw these conclusions from all this material:

1. The improvement of the quality of our environment depends on threading our way through conflicts of jurisdiction and competition for power. With care we can, however, fix the primary responsibility for water and air pollution.
2. The legislative programme introduced in Ontario needs free information and constant public scrutiny to keep it working or it will be the shield and protector of the polluters.

3. The common law has some aid to offer and could be made truly effective by changes in our rules for court costs, contingent fees, class actions and punitive damages, and public pressure on the courts to defend the rights of citizens of ordinary means to a healthy environment.
4. Effective political pressure is possible only if long term dedicated commitment is available from a hard core of people having a real concern for the environment.

It is overall a tough picture. I wish us all luck.

3. The common law has now said so often and so often
has made truly effective by changes in our laws
for courts over, thoughtful laws, which declare
and positive changes, and public pressure on
the courts to defend the rights of citizens
of ordinary sense in a healthy environment.
4. Effective political movements is possible only
if the movement is available
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**A UNIFIED APPROACH TO ENVIRONMENTAL
PROTECTION AND OTHER COMMUNITY GOALS**

BY:

**VLADIMIR MATUS, M.C.I.P., M.R.A.I.C.
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REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH.**

**HAMILTON ENVIRONMENT '80, A Conference on a
Quarter Century of Environmental Progress
in the Hamilton Area and a Blueprint for the
Future.**

**SPONSORED BY THE CITY OF HAMILTON
FRIDAY 14 NOVEMBER and SATURDAY 15 NOVEMBER 1980
MOHAWK COLLEGE OF APPLIED ARTS AND TECHNOLOGY
135 FENNEL AVENUE
HAMILTON, ONTARIO.**

Very few people would argue with the notion that we are a somewhat confused society.

Perhaps the problem lies in the way we organize our thoughts. In order to grasp and manage the reality, the complex world around us has been divided into a number of convenient compartments. Each compartment has a head and its boundary is jealously guarded by a group of highly-specialized experts.

Thus,

- economic growth and development;
- environmental protection;
- energy conservation and management; and,
- urban and regional planning,

became four areas which are considered as separate entities. They are managed by independent regulatory agencies or departments. It is commonly believed that their respective philosophies and goals are mutually exclusive.

Perhaps we should have a closer look and investigate their views and ideas:

1. We will start with the first group, which I would like to call the "progress pushers". Somehow, they are reluctant to accept the fact that our present situation is serious; "If, indeed, we are running into some difficulties", they say, "then growth and more growth is the only solution to our economic, environmental, energy and urban problems."

The political appeal behind this idea is obvious: only more growth will supply the tax money needed to solve the problems created by past growth.

This group does not appear to be very loud, but it is very powerful. Its strength is derived from two convictions:

- the conviction that to freeze continuous development, and thereby human process, is a more unnatural act than to temporarily or even permanently upset the ecological

equilibrium; and,
- the conviction that this view is backed by a vast majority of the population.

2. The second group is well organized, small, but eloquent. They call themselves "environmentalists".

It was the environmental movement which first put forward the argument that the present course of our technological society is dangerous. Their argument was simple:

The bearing capacity of the natural environment is limited. We are rapidly approaching these limits.

As a result, some environmentalists have had, from time to time, a tendency to put the welfare of groundhogs, crickets and butterflies above that of human beings. In any case, negative growth, no growth and moderate growth are the major headlines of the environmental philosophy.

Since this is an environmental conference, I would like to present to you a proclamation of environmental responsibility. It was written about one hundred and thirty years ago, and is described as the most beautiful and profound statement on the environment ever made:

*How can you buy or sell the sky, the warmth of the land?
The idea is strange to us.*

If we do not own the freshness of the air and the sprinkle of the water, how can you buy them?

Every part of this earth is sacred to my people. Every shining pine needle, every sand shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people. The sap which courses through the trees carries the memories of the red man.

The white man's dead forget the country of their birth when they go to walk among the stars. Our dead never forget this beautiful earth, for it is the mother of the red man. We are part of the earth and it is part of us. The perfumed flowers are our sisters, the deer, the horse, the great eagle, these are our brothers. The rocky crests, the juices in the meadows, the body heat of the pony, and man - all belong to the same family.

So, when the Great Chief in Washington sends word that he wishes to buy our land, he asks much of us. The Great Chief sends word he will reserve us a place so that we can live comfortably to ourselves. He will be our father and we will be his children. So we will consider your offer to buy our land. But it will not be easy. For this land is sacred to us.

This shining water that moves in the streams and rivers is not just water, but the blood of our ancestors. If we sell you land, you must remember that it is sacred, and you must teach your children that it is sacred and that each ghostly reflection in the clear water of the lakes tells of events and memories in the life of my people. The water's murmur is the voice of my father's father.

The rivers are our brothers, they quench our thirst. The rivers carry our canoes, and feed our children. If we sell you our land, you must remember and teach your children that the rivers are our brothers, and yours, and you must henceforth give the rivers the kindness you would give my brother.

We know that the white man does not understand our ways. One portion of the land is the same to him as the next, for he is a stranger who comes in the night and takes from the land whatever he needs. The earth is not his brother, but his enemy, and when he has conquered it, he

moves on. He leaves his fathers' graves behind, and he does not care. He kidnaps the earth from his children, and he does not care. His father's grave, and his children's birthright are forgotten. He treats his mother, the earth, and his brother, the sky, as things to be bought, plundered, sold like sheep or bright beads. His appetite will devour the earth and leave behind only a desert.

I do not know. Our ways are different from your ways. The sight of your cities pains the eyes of the red man. But perhaps it is because the red man is savage and does not understand.

There is no quiet place in the white man's cities. No place to hear the unfurling of leaves in spring, or the rustle of an insect's wings. But perhaps it is because I am a savage and do not understand. The clatter only seems to insult the ears. And what is there to life if a man cannot hear the lonely cry of the whippoorwill or the arguments of the frogs around the pond at night? I am a red man and do not understand. The Indian prefers the soft sound of the wind darting over the face of a pond, and the smell of the wind itself, cleansed by a mid-day rain, or scented with the pinon pine.

The air is precious to the red man, for all things share the same breath - the beast, the tree, the man, they all share the same breath. The white man does not seem to notice the air he breathes. Like a man dying for many days, he is numb to the stench. But if we sell you our land, you must remember that the air is precious to us, that the air shares its spirit with all the life it supports. The wind that gave our grandfather his first breath also receives his last sigh. And if we sell you our land, you must keep it apart and sacred, as a place where even the white man can go to taste the wind that is sweetened by the meadow's flowers.

So we will consider your offer to buy our land. If we decide to accept, I will make one condition: the white man must treat the beasts of this land as his brothers.

I am a savage and I do not understand any other way. I have seen a thousand rotting buffalos on the prairie, left by the white man who shot them from a passing train. I am a savage and I do not understand how the smoking iron horse can be more important than the buffalo that we will kill only to stay alive.

What is man without the beasts? If all the beasts were gone, man would die from a great loneliness of spirit. For whatever happens to the beasts, soon happens to man. All things are connected.

You must teach your children that the ground beneath their feet is the ashes of our grandfathers. So that they will respect the land, tell your children that the earth is rich with the lives of our kin. Teach your children what we have taught our children, that the earth is our mother. Whatever befalls the earth befalls the sons of the earth. If men spit upon the ground, they spit upon themselves.

This we know: the earth does not belong to man; man belond to the earth. This we know. All things are connected like the blood which unites one family. All things are connected.

Whatever befalls the earth, befalls the sons of the earth. Man did not weave the web of life: he is merely a strand in it. Whatever he does to the web, he does to himself.

Even the white man, whose God walks and talks with him as friend to friend, cannot be exempt from the common destiny. We may be brothers after all. We shall see. One thing we know, which the white man may one day

discover - our God is the same God. You may think now that you own Him as you wish to own our land; but you cannot. He is the God of man, and His compassion is equal for the red man and the white. This earth is precious to Him, and to harm the earth is to heap contempt on its Creator. The whites too shall pass; perhaps sooner than all other tribes. Contaminate your bed, and you will one night suffocate in your own waste.

But in your perishing, you will shine brightly, fired by the strength of the God who brought you to this land and for some special purpose, gave you domain over this land and over the red man. That destiny is a mystery to us, for we do not understand when the buffalo are all slaughtered, the wild horses are tamed, the secret corners of the forest heavy with the scent of many men, and the view of the ripe hills blotted by talking wires. Where is the thicket? Gone. Where is the eagle? Gone. The end of living and the beginning of survival.

I hope you agree with me that the should be printed in golden letters and hung on the wall of every classroom and every home.

3. A relatively new and rapidly-expanding religious group is actually an offshoot of the environmental movement: the "energy conservationists". Their apparent aim is to turn our lives into utmost misery. According to their teachings, we should use elevators only on the way down, watch unplugged television sets, and use the bathroom only once a week. Apocalyptic visions of horrible catastrophes should give us the necessary strength to pedal our bicycles throughout the winter.

Their argument is that wastage of energy is neither economically nor morally justifiable. Ironically, we have little choice but to expose our past foolishness by now discovering how much energy can be saved.

A question remains to be answered, however. What will we do after we reach the limits of conservation and retrofitting?

Thus far, the energy conservation movement has succeeded in obtaining public acceptance of minor annoyances such as the idea of driving small, lazy cars. Or sharing a van with ten others on the way to work and back. Or even using mass transit. But to suggest that we should re-arrange our community in such a manner as to avoid travelling twice a day is still a cultural tabu.

4. The last area of our cursory investigation is a rather peculiar one. Individuals who belong to this particular compartment are outcasts, sometimes hated, but always despised. As a matter of fact, if there were no such provincial legislation as "The Planning Act", the community would devour them without even bothering to spit out the bones.

I am talking about planners.

In theory, a planner is supposed to be a highly-trained individual in many disciplines. As a generalist, he is capable of digesting and analyzing the enormous complexities of community life and distinguishing critical problems from the peripheral ones.

Thus, a planner is able to outline the goals and objectives for the future development and welfare of the community.

This is all in theory, of course.

In practice, he is an ingenious survivalist. He has fortified himself in a bastion of antiquated procedures, overlapping jurisdictions and land use laws based on 19th Century realities. When asked to translate

political pressures into technical language, he is able to do that with great skill.

As we can see, the community is caught in the midst of a war. Four empires are striking back.

Under these circumstances, is it possible to suggest that these seemingly irreconcilable adversaries are, in fact, different manifestations of the same intention to solve our common problems?

Let's talk about common problems and begin with the most important one: Environmental Overload and Energy Consumption.

The simplest description of what we call an ecological balance in nature would be the following: All living systems are interdependent. The refuse of one system is fuel for another. This closed loop is propelled by the sun.

Ocasionally, one of the living systems starts to run wild. It requires more food than is available and produces more refuse than can be handled by the others. It is well documented that this type of behaviour is another form of suicide.

It is interesting to find out how humans fit into this elegant picture.

As you may suspect, throughout history, man has continuously violated the natural equilibrium. He has done this by systematically improving his own living conditions. The degree of improvement has been directly related to the amount of human labour invested. To sustain the comfort and conveniences comparable to what we are used to today, the work of about 250 healthy slaves was required. For each man living in comfort, 250 human beings had to live in misery.

Luckily, in recent years, we have been able to exchange the lash for an electrical switch. We have all become "slave masters". Our life standard has surpassed the wildest dreams of any past social reformer.

We can congratulate ourselves, but we cannot retire. Unfortunately, there are penalties for this systematic improvement in one's living conditions.

The first one relates to energy:

Hunting cultures derive most of their energy from meat. One square mile is able to support one man. Agricultural societies derive most of their energy from plants. In this case, one square mile can support one hundred people. Finally, industrial cultures derive most of their energy from minerals. The bearing capacity of one square mile is about three hundred people.

It will take a lot of ingenuity to determine how to go from here. If the present trend is going to continue, more and more people will have to be supported by less and less land. Such a situation cannot be carried by the energies derived from traditional sources. At the moment, improved nuclear and improved solar technologies appear to be the best solutions available.

The second penalty is environmental. Improvement in human living conditions has a profound impact on earth's natural life supporting base.

We are used to hearing that technological man is the most arrogant species that has ever existed on this planet. Recent in-depth studies are revealing that humans have made a substantial and continuous impact on climate since the invention of fire. To be more precise, since the invention of cooking.

The present data indicates that the cumulative impact of all human activities, including pre-technical ones, has been about six times greater than the impact of the technological period of the last twenty-five years.

Therefore, it can be safely assumed that the natural equilibrium is disturbed in direct proportion to the degree of improvement in human living conditions. A continuous and accelerating disturbance of the equilibrium has brought us to the limits of nature's bearing capacity.

Thus, our challenge is paramount.

To go back is to go back to misery. The good old days were good only for the slave masters. The only way we can go is forward - in other words, we are doomed to push progress.

But progress must not be seen through the telescopic vision of the fifties. Uncontrolled growth and development is a wonderful dream belonging to a small society living in a giant territory of seemingly inexhaustible resources. We already know that this is not our case.

Therefore, we must pursue prosperity and economic welfare without undermining our natural life support base. We have to re-establish our contractual relationship with our natural surroundings. Whatever we take from nature has to be carefully weighted against what we leave behind. Only in this way might our present parasitism be replaced by a form of symbiosis.

There is very little hope of accomplishing this goal by endless confrontations. We have to drop the artificial barriers which divide us. The development of a unified approach to all community goals is mandatory.

To create a paradise for all of us in our fragile natural environment is indeed, a paramount challenge. But one thing

is certain: it cannot be achieved without a great deal of sophistication, environmental responsibility and systematic planning.

THE OBLIGATION OF THE MEDICAL PROFESSION IN
THE CONTROL OF ENVIRONMENTAL POLLUTION

by Harry Paikin, M.D.

Pollution is the noun form of the verb pollute. It is derived from the Latin word pollutus, past participle of polluere, which means to pollute, that is, to make unclean, impure, corrupt, or to contaminate. Pollution and contamination are synonymous terms. Contamination, in turn, is derived from the Latin root contaminare. It implies contact or contagion and is made up of two parts, con, together, plus tangere, to touch. Contaminate means to make impure, unclean or corrupt by contact, such as pollution of the air by fumes.

Pollution is a disease of society. It is the result of social waste that adversely affects the environment, the air we breathe, the water we drink or bathe in, and the food we eat. Since ours is an industrial society we are victimized by the wastes produced by manufacturing companies that, without due circumspection or consideration for the deleterious effects upon our social environment, spew their industrial wastes into our atmosphere, or unload them into our bays, lakes and rivers, thereby contaminating our water resources.

As a result, society is continually confronted with hazards affecting air safety, water quality and food edibility. That industry must not only continue to exist, but to thrive in modern society, is taken for granted as a basic premise for society's viability. But industry cannot be permitted to exist and to thrive at the expense of society. Disregard of industry's deleterious effects on our environment simply means the charting of a suicide course for society. What we require then are safeguards established and built in for the protection of society.

An article in Time magazine of September 22nd, 1980 entitled "The Poisoning of America", highlights some startling facts, namely:

- modern chemistry produces 1,000 new concoctions each year
- nearly 50,000 chemicals are on the market
- almost 35,000 chemicals used in the United States are classified by the E.P.A.,

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the Federal Environmental Protection Agency, as hazards to human health.

----- of the 77 billion pounds of hazardous chemical wastes produced in the United States each year, only 10% are being handled in a safe manner.

----- millions of gallons of contaminated waste water are deposited in dumps, ditches and sewage disposal systems resulting in contamination of surface water and ground water that serve as drinking water for millions of Americans.

----- 50% of Americans depend upon ground water rather than surface water for their drinking supply. There is a steady rise in the number of wells being contaminated.

----- the producers of chemicals are not required to keep records with respect to what they do with their waste materials.

----- notorious examples of poisonous chemical wastes that contaminate the environment are Polychlorinated Biphenyls or P.C.B.'s that are linked with birth defects and nervous disorders, lead, mercury, arsenic, picric acid, pesticides and plasticizers.

The prime function of the doctor is to safeguard the health of the people.

The prime function of the doctor is not to be simply a repair mechanic. A philosophy of medicine that relegates the duties of the doctor simply to reparative actions is a bankrupt philosophy, anachronistic, out of touch with the march of medicine. The future of medicine lies in the prevention of disease, both individual and sociological. We have reached an era in which medicine can no longer be regarded just as a service in society but must occupy the role of a service to society.

The great division of medicine known as Public Health Medicine, operated by the government, is valiantly attempting to protect the health of the public in all aspects, but it cannot do a proper job alone. It has not the manpower and requires the assistance and cooperation of the whole medical profession in the implementation of both its practice and its philosophy. Without the assistance and cooperation of the practising doctors, no immunization program could get off the ground. Poliomyelitis immunization

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was successful and small pox was licked because of the active help of the medical profession.

Hitherto doctors have not considered that the sociological diseases come within their purview and are their problem. They have looked upon the sociological diseases, of which pollution is a prime example,---other examples being poverty, alcoholism, unemployment, child battering, etc.---much as they have looked on politics, as something to keep out of. But unfortunately, neither politics nor the sociological diseases will keep out of medicine. Doctors must treat respiratory and gastrointestinal diseases directly caused by noxious gases, fumes and dust, in the case of the former and by human, animal and industrial waste in the case of the latter.

Surely the medical profession must realize, in this era, that it is not enough simply to treat the diseases caused by air-borne and water-borne pollution but that it must militantly take steps to control air-borne and water-borne pollution hazards, just as it has so laudably, in the past, taken steps to control the communicable and infectious diseases such as small pox, tuberculosis, diphtheria, typhoid fever, typhus, cholera, measles and poliomyelitis.

What must those militant steps be? In the matter of the control of the communicable diseases, the expenditure of time, effort and money were involved both on the part of the government and on the part of the medical profession. There was great opposition from many quarters. Chlorination and filtration of water were opposed by certain factions because of the bother and expense to the taxpayers and small pox vaccination was opposed even by such great intellects as George Bernard Shaw on the ground that it was an infringement on personal freedom. However, governments, ably aided by a convinced and cooperative medical profession, persisted in their goals of protection of the public. Today we have reached the happy state wherein small pox vaccination is no longer required because the disease has been virtually eradicated throughout the world. Typhoid fever no longer exists in any civilized community. The occurrence of even one case in a municipality is regarded as a disgrace. Pasteurization

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has greatly reduced the incidence of Tuberculosis and other milk-borne diseases and because of the Salk vaccine, the dreaded Poliomyelitis no longer occurs in epidemic form. One of the earliest acknowledgements of a new sociological role on the part of the medical profession occurred when the profession agreed to take part in free polio inoculation programs in various communities.

It now remains for the medical profession to acknowledge its sociological role in the control of such sociological diseases as pollution. Tuberculosis, cancer of the lung, asbestosis, pneumoconioses, etc. are diseases attributable to dust and fumes.

It is not enough for the doctor to treat them, then shrug his shoulders when asked about preventing them. There are some who maintain "I am not my brother's keeper". Others will pass the buck and say, "It is not a job for a doctor but for a sociologist". Surely we must recognize that the time has come when the designation doctor is not enough, does not encompass enough, but that every doctor must henceforth wear the mantle of doctor-sociologist.

Why the term doctor-sociologist? Because medicine has today attained the fifth level or stage in the evolution of medicine, namely, Sociological Medicine. Medicine has already evolved through four stages. The first stage was religio-mystical medicine, as practised by priests, witch-doctors and necromancers; the second stage, empirical medicine, the medicine of trial and error, the concept of disease as being due to natural causes and amenable to treatment by natural means, as promulgated by Hippocrates; the third stage, scientific medicine, the medicine of experimentation and controls as developed by Louis Pasteur and Joseph Lister; the fourth stage, psychological medicine, the interaction of mind and body, as taught by Sigmund Freud. Sociological Medicine, the fifth stage or level in the evolution of medicine, concerns itself not only with the diseases of the individual, but with the diseases of the whole of society, particularly as they affect the individual. Who can deny that such sociologica

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diseases as poverty, unemployment, sexual and racial discrimination, ghettoization and pollution not only affect the physical and mental health of the individual, but that they also militate against the recovery of the individual from many common ailments such as respiratory, cardiac, gastrointestinal and rheumatic diseases?

The obligation of the medical profession in the sociological age is to treat not only the patient but his environment. Patients with chronic bronchitis and emphysema cannot get better when forced to breathe factory air overladen with Sulphur Dioxide. People afflicted with mercury poison caused by eating fish from mercury polluted waters, the well-known Minamata Disease, cannot survive when forced to choose between a continuous diet of mercury-poisoned fish or starvation.

Doctors must become articulate. They must indict, vociferously, callous and greedy industrial systems whose improperly treated industrial wastes destroy the health of workers and citizens. Do doctors condone the destruction of the people's health? Hitherto they have not spoken out against pollution. Is their silence synonymous with acquiescence? A myriad smokestacks blacken the sky, millions of automobiles pour carbon monoxide into the atmosphere, acid rain falls on rivers and lakes destroying fish, and on gardens, orchards and wheat fields. Vast water resources are spoiled by the dumping into them of human, animal and industrial wastes and poisons; miles of once healthful and beautiful beaches are destroyed by oil spills and foul chemicals. And the medical profession says nothing; utters not a word; lets it all happen. Why? Because the medical profession has not yet measured up to the new sociological philosophy that heralds its coming of age in the sociological era. It has, so far, failed to learn a lesson from Ralph Nader.

Why should the obligation fall particularly upon the medical profession, one may well ask? The answer is simple. It is as plain as the proverbial nose upon the proverbial face. It is because the medical profession of all disciplines, groups and bodies in society should be the most knowledgeable about, and most aware of, the ravages

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of the pollutions and the detrimental effects upon the health of the public.

Because of its intimate knowledge of health and disease, it becomes the duty of the medical profession to safeguard the public against the effects of pollution. How is it to do this? By making representations to government, by meetings with representatives of industry, by seeking through political figures to introduce anti-pollution legislation in Parliament, by education of the public through public meetings and the media, and by initiating campaigns against tobacco smoking in public places.

Specifically, the medical profession can ask for local laws to be passed requiring proper clearing, grading and drainage control, to regulate storm-water run-off from developments. It can request ordinances requiring sediment traps and catch basins during and after construction work. It can request legislation that will preserve stream-side vegetation, such as trees, shrubs and grass that protect streams and prevent erosion. It can demand that chemicals should be properly disposed of, that toxic industrial wastes should not be dumped into storm drains, ditches, streams, ponds or lakes and that dump sites be properly selected so that poisonous chemicals be not permitted to seep through soil and poison our underground water resources. It can ask that provincial and federal governments take strenuous measures to protect the air from noxious gases spewed from factory smoke-stacks, that acid rain be prevented in order to preserve fish life, and that waters, upon whose fish many people, particularly Indians in our northern areas, depend for food, be protected from poisoning by mercury and other chemicals. It can do these things if it will and it must do them with teeth.

In the modern age, it is not enough for the doctor to make a diagnosis, order a diet and prescribe medication for the patient. The modern doctor, in order to ensure proper recovery and continuing health, must take steps to provide for the patient, a safe, clean, pure and healthful environment. Then, and only then, will he have properly fulfilled his obligation.

Society sends out its challenge to organized medicine to join ranks with other forces engaged in the battle against pollution, such forces as organized labour, political

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parties and concerned and conscientious bodies such as CHOP, or Clear Hamilton of Pollution. It is a challenge to organized medicine to make its great philosophic leap from its self-conception as a reparative discipline to its maturation as a sociological force giving true and cogent leadership to society in its march toward finer individual and community health.

Twenty-Five Years of Air Pollution Health Research

Emanuel Landau
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Introduction

Three weeks ago, as if anticipating this anniversary, the Washington Post ran an article in which a long-term Youngstown resident made the following statement: "I remember when the steel mills caused so much soot in this valley and the Mahoning River never froze over. My father used to say to me 'See that silt on the windowsill? That means the mills are working.' That was a sign of prosperity."

We all know that man's capacity for invention and technological improvement has led to the development of the present level of material comforts, the tremendous growth of population, and the spectacular increase in the urbanization and mobility of the industrialized nations. All this progress has not been accomplished without some deleterious effects. A highly significant one is air pollution, as we have just indicated.

Our knowledge of man-made air pollution prior to the nineteenth century is meager. It has been pointed out that there have been references to blackened buildings and monuments in ancient civilizations. Nonetheless, it is possible to infer that air pollution did not constitute an important enough problem to cause public concern. It is a question of the amount of fuel used or the per capita and total use of energy. It was low then and it is high now.

In England, over the centuries, various limitations and prohibitions relating to the use, importation, and transport of coal have been promulgated. Until quite recently, these regulations and the various investigative committees have not been too significant.

The culmination of the lack of restrictions on the burning of coal was the London air pollution episode in December, 1952, with some 3,500 to 4,000 "excess" deaths among Londoners. Relatively recent retrospective analyses of the mortality records for London have revealed many disasters which were similar but of lesser magnitude in the nineteenth and twentieth centuries.

In this presentation I do not intend to survey the entire field of health effects of air pollution. Clearly, this would not be possible. Instead, I want to discuss briefly the reliability of epidemiologic research. Then, I will devote the remaining time to a discussion of selected British and North American studies, paying particular attention to a recent Canadian report comparing Ottawa and Sudbury. The evidence which associates air pollution with chronic obstructive ventilatory disease and lung cancer comes from three types of investigations: statistical studies of morbidity

and mortality, epidemiological studies, and clinical and laboratory studies of animals -- and, in some cases, of humans.

Reliability of Epidemiologic Research

About twenty-five years ago, I was assigned by the U.S. Public Health Service to work with Dr. Lester Breslow, of the California State Department of Public Health, who is currently Dean of the School of Public Health at UCLA. In the process, I acquired what I think was sound epidemiologic training, so that during my subsequent assignment to WHO at Geneva, I was able to work with my Russian counterpart, Dr. Bushtueva, and to point out to her that it takes more than good intentions to do good science and particularly good epidemiology. This is something apparently that the Russians do not understand nor appreciate and, unfortunately, that view seems to be quite common in the United States too. It is believed that if your intentions are good, the resulting work must be good. Nothing could be further from the truth.

A decade ago, in the then National Air Pollution Control Administration (now EPA) air quality criteria reports on sulfur oxides and particulate matter, I included the following three remarks while writing the conclusion of the epidemiologic chapter. They are still believed to be relevant today and will serve to put the issues to be discussed here into perspective.

"Analyses of numerous epidemiological studies clearly indicate an association between air pollution, as measured by particulate matter accompanied by sulfur dioxide, and health effects of varying severity. This association is most firm for the short-term air pollution episodes.

"There are probably no communities which do not contain individuals with impaired health who are particularly susceptible to the adverse effects of elevated levels of particulate matter and sulfur oxides. However, to show small changes in deaths associated with coincident higher levels of air pollutants requires extremely large populations. In small cities, these changes are difficult to detect statistically. . . .

"The association between long-term residence in a polluted area and chronic disease morbidity and mortality is somewhat more conjectural."

Let us see why we have described this type of study as "somewhat more conjectural." Simply put, there may be insufficient data associated with air pollution monitoring currently and in the past, demographic characteristics, socio-economic status, cigarette smoking and other significant variables.

We have noted that the most dramatic and most accepted illustrations of adverse health effects due to air pollution have been the acute episodes in which serious illness due to sharp increases in air

pollution concentrations was sudden in onset and in some cases fatal in outcome. The best known are those in the Meuse Valley, Belgium (1936); Donora, Pennsylvania (1948); Poza Rica, Mexico (1950); London (1952 and 1962); and New York City (1953). Excess deaths over normal expectancy ranged from 17 in Donora to 4,000 in the 1952 London smog. In six other recorded episodes in the British Isles prior to 1952, going as far back as 1873, excess deaths ranged from 75 to 692 and totaled over 2,500. In all instances, most of the fatalities occurred among persons who were already suffering from chronic cardiorespiratory disorders. Since some of the diseases, such as lung cancer and tuberculosis, were obviously existent before the 1952 pollution episode, much of the effect of the fog was clearly to hasten the death of people who were already ill. Detailed investigations were made of 1,280 post-mortem reports of Londoners who had died before, during, or shortly after the episode. No fatalities were found which could not have been explained by previous respiratory or cardiovascular lesions. It is worthy of note that in writing about the Meuse Valley episode in 1936, Firket stated that if there were a similar phenomenon in London, some 3,200 deaths might occur. Unfortunately, he was quite accurate in his estimate.

Let me add that the causative agent has been identified with certainty only for the last-named industrial air pollution episode. The agent was hydrogen sulfide. Twenty-two deaths and the illness of 320 persons resulted from the release to the atmosphere of large amounts of this gas. The distinguishing feature of this type of industrial episode is that the pollution originated in a limited number of sources in the area as distinguished from the multiple sources generally associated with the use of fossil fuels.

Although these acute episodes of high levels of air pollution are sensational and tragic, public health authorities are concerned today with possible adverse effects of air pollution levels which are much lower but are continued day after day and year after year. The air pollution disasters obviously have public health implications for air pollution control. However, of possibly greater public health significance is the substantial scientific acceptance currently of the thesis that "certain" levels of air pollution do increase the prevalence or severity of chronic respiratory diseases.

Twenty-Five Years of Research

More than a quarter of a century ago, in February 1952, the Air Pollution Abatement Committee of the Manufacturing Chemists Association Inc. (now the Chemical Manufacturers Association) published its booklet entitled "A Rational Approach to Air Pollution Legislation."

Attention was called to the undesirability of the unlimited release of waste products since this had created the Donora incident of 1948 and the "annoying Los Angeles smog." The former episode was

noted as being unique, with no similar occurrence elsewhere being noted in the United States.

The article then continued: "Clearly air pollution is not a serious or a critical menace to public health. Longevity is steadily increasing along with expanding industrialization. Scientific proof of relationship between air contaminants and damage to health has been exceedingly elusive in spite of extensive research. People generally are not justified in fearing that their health is endangered by air pollution. However, there is no doubt that cleaner air would make our industrial communities pleasanter places in which to live.

"Inasmuch as health is not a dominating factor, are there other considerations that might stimulate a community to consider a law to curb air pollution? Yet it cannot be denied that in some localities air pollution is a nuisance -- a very real one."

It is only necessary to recall that at the end of that year, in an episode lasting 5 days in London, there were 4,000 excess deaths associated with the winter air pollution episode. This London disaster afforded an unparalleled opportunity to search for the etiologic agents. Because the atmospheric pollutants measured were sulfur dioxide and black smoke, the extremely high values for these ambient contaminants of about 4500 ug/m³ smoke and about 4000 ug/m³ SO₂ (1.34 ppm) were considered to be the causative agents.

It may be timely to note and comment on Martin's conclusion in 1964 concerning the daily mortality data for London during the winters of 1958-59 and 1959-60: "From the data it would be difficult to fix any threshold value below which levels of air pollution (smoke and SO₂) might be regarded as safe."

This is not necessarily true. In a recent report (1978) by the United States National Academy of Sciences on sulfur oxides, the authors have used cautionary language in measuring exposures and effects as follows: "The question of whether sulfur dioxide is a surrogate and/or an active component associated with health effects needs resolution. If sulfur dioxide is a surrogate, is it a surrogate for something quite different, or is it a surrogate for related compounds, such as sulfates? Continuing effort must be directed toward the difficult task of determining to what extent sulfur dioxide affects health directly or is a surrogate for other air pollutants or other factors."

The significance of particle size and chemical composition of the particles has also attained considerable visibility in recent years. There is substantial discussion of the lack of value of measurements of total suspended particulates in the United States in assessing the level of fine or inhalable particulates, which are the particle sizes of interest and concern.

Selected British Studies

What are the most relevant British studies in the development of scientific air quality criteria?

The British study of acute mortality which is most relevant is the Martin and Bradley study of 1960, which I summarized in the 1969 Criteria Report for Sulfur Oxides, using Lawther's interpretation of their results, as follows: "At concentrations of about 715 ug/m^3 (0.25 ppm) of sulfur dioxide and higher (24-hour mean) accompanied by smoke concentrations of 750 ug/m^3 and above, an increased daily death rate may occur." This is still my view, though WHO has recently changed the effect levels to above 500 ug/m^3 for sulfur dioxide and for smoke.

The summary of Lawther's work on his panel of bronchitics at St. Bartholomew's Hospital included in the criteria report is still believed to be valid. I noted that acute worsening in significant numbers of the group was associated with daily rises in air pollution above 300 ug/m^3 smoke and 600 ug/m^3 (0.21 ppm) of sulfur dioxide.

In their 1970 article, Lawther et al. not only took pains to note that it was impossible to disentangle the role of smoke and sulfur dioxide in the health patterns of bronchitics, but raised the question as to their role at all. They said (on p. 537): "We have not been able to show which pollutant or a combination of pollutants is responsible for the associated exacerbations and the concentrations of smoke and sulphur dioxide used can only be regarded as indices of the active agents." They also indicated that the response of patients may have been more likely due to brief exposures to much higher peak concentrations that probably occurred during high pollution days.

The British study of chronic morbidity which I believe is most acceptable for criteria development is that of Lunn et al. Currently, the annual values I would suggest from this study are 180 ug/m^3 and above of SO_2 and 230 ug/m^3 and above of smoke.

As stated previously, the National Academy of Sciences has recently prepared a criteria report on sulfur oxides. With regard to that report, one of the things that is really of concern to me is the fact that the report itself is quite good in terms of epidemiologic evaluation, but the careful evaluation of the research does not seem to extend to the construction of the dose-response curves. And accordingly, this would appear to create a problem because most people I am certain will go ahead and use the dose-response curve without looking at the underlying deficiencies, sometimes extremely severe, of some of the studies cited and used in this dose-response curve. I am most uneasy about an apparent biological inconsistency which exists in the monograph. Citing Martin's work, which I have mentioned, the authors have presented a table indicating lower values

of sulfur oxides and smoke as necessary to induce mortality than morbidity. The sulfur oxides values are 277 ug/m³ as the intercept for mortality and 340 ug/m³ for zero excess morbidity. The corresponding British Smoke values are 407 ug/m³ and 516 ug/m³ respectively. It would appear to me that an explanation to the reader is clearly in order, because this does not seem to make biological sense. Perhaps somebody in the audience might explain to me why this kind of analysis does actually fit the facts. I think what we get from the monograph itself is that it aptly demonstrates the difficulties of conducting quantitative epidemiologic research in sulfur oxides and of the particular difficulty of obtaining the necessary critical evaluation.

Selected United States Studies

What is the experience of the United States in conducting epidemiologic studies of the health effects of air pollution?

Early in the history of the United States Government's effort, the air pollution problem was dubbed the "double orphan" by a prominent epidemiologist. This was because there were on the one hand many potential agents not proven to produce disease (conquerable with the "orphan viruses") and, on the other hand, many disease states in man which conceivably could be influenced by or caused by air pollution constituents, but were not known to be.

The pre-1960 report entitled "Air Pollution-Effects Reported by California Residents" from the California Health Survey, was published as a special report of the Air Pollution Study of the California State Department of Public Health. This was a multifaceted review covering the range of mortality and morbidity data. There is no need to point out that the report's use of "smog" is a misnomer inasmuch as neither smoke nor fog was responsible.

The review noted the analysis of daily mortality since 1954 for Los Angeles County. Deaths from all causes and from selected causes (cardiac and respiratory) as well as death in the older, frailer segment of the population (those 65 years and older) were studied in relationship to air pollution as measured by the oxidant index and other means.

Since 1955, the State Department of Public Health has also maintained surveillance over the aged population through the cooperation of all nursing homes of 25 beds or more. These approximately 100 homes with a total of close to 5,000 beds reported the daily numbers of deaths and transfers to hospitals. These data were compared with daily readings for downtown Los Angeles.

No significant increases associated with rises in oxidant measurements have been noted in daily mortality in the total population, in sub-population groups, or in the number of deaths and transfers in nursing homes. The report also discussed the heat

wave of September 1955 and the belief that pollution was responsible for the excess mortality. Both oxidant measurements and the number of daily deaths rose but were paralleled by extremely high temperatures. The close parallel of temperature and oxidant readings made it impossible to be certain whether any of these deaths might have been attributed to air pollution. The report concludes: "However, the lack of any relationship between number of deaths and oxidant measures during preceding and subsequent periods and the clear relationship of mortality to high temperature strongly suggests that the high temperature in September 1955 was the reason for the sharp rise in deaths."

Another pioneer effort to evaluate the effects of air pollution represented an attempt to use panels of asthmatics as a study population. This broad term "air pollution" is used advisedly because the first study done, that of a panel of 137 asthmatics in the Los Angeles area of Pasadena, between September and December 1956, was concerned with the association with smog as measured by photochemical oxidant. Each patient kept a record of the exact hour of each day on which his asthmatic attacks occurred during the nine-week period. These data were summarized and related to daily oxidant measurements both by interval of day and by lagging of days. There was no significant evidence of increase in asthma attacks associated with a rise in oxidant measures. I was associated with the study.

Finally, the State Department of Public Health conducted the first California survey in May 1954 and continued it for 52 weeks. This was the first opportunity to measure morbidity in the general population of Los Angeles County during smog and non-smog periods. The study concluded that "no appreciable increase in total morbidity was noted during the periods of increased air pollution."

The other early asthma assessment, one element of a four-pronged study in Nashville, covered the association with a coal-burning type of air pollution as measured by sulfur dioxide for the period July 14, 1958 to July 12, 1959. This Nashville Air Pollution Study, under the direction of the late Dr. Louis Zeidberg, represents the earliest American effort to study the health effects of chronic exposure to sulfur oxides and particulates. This was followed by the Buffalo Air Pollution Study directed by Dr. Winkelstein.

Beginning in 1961, a series of studies was conducted in Berlin, New Hampshire, and, subsequently, also in Chilliack, British Columbia, by Dr. Ferris and his co-investigators. This series was designed to represent the first effort to study effects sequentially in a pulp mill town. The surveys were conducted in 1961, 1967, and 1973.

I summarized the results of the 1961 study in the criteria report as follows: "As in the two-town study, the disease rates in the two areas of the town was strongly affected by differences in the proportions of two populations who were cigarette smokers. The authors correctly note the limited possibility of ascertaining

effects due to the very low pollution values and the movement of people with respiratory disease to the even less polluted areas of Berlin."

The chapter in the NAS Report on Sulfur Oxides, of which Ferris was a co-author, states that the series of studies "can be used to separate the effects of sulfur oxides and particulates," and suggests that any effects were due to total suspended particulates. However, this report fails to note the limitations regarding the particulate measurement in 1961 (a single station for August and September only). The WHO report does note this limitation and concludes that "there is still some doubt as to whether the three sets of results are truly comparable." While it does say that "sulfur oxides and particulate matter may have been of importance" (underlining added), it adds that "only sulfation data are available for sulfur oxides in the 1961 study." Also, it did note that the value of 180 ug/m³ for TSP was a "2-month mean, possible underestimation of annual mean." The view that these studies are difficult to interpret appears to represent the most reasonable interpretation, especially inasmuch as Ferris et al. themselves point out in their 1976 report that they do not know the representativeness or relevance of the Berlin data to other communities. I agree with the WHO decision not to use this study for preparing guidelines and with its statement on page 92 that evidence on effects associated with TSP was "highly unsatisfactory."

A Recent Canadian Study

This review of the comparative study of disease prevalence and ventilatory function in Ottawa and Sudbury, Ontario (Ottawa 1961-71 and Sudbury 1972-73) will note what I believe are some significant limitations for its possible use in assessing air quality criteria. However, these comments are not meant to detract from the high scientific quality of this study.

The discussion of the problems relating to air monitoring points out the unsatisfactory background pollution information for the two cities. The overwhelming emission of SO₂ in Sudbury is emphasized, with Ottawa having higher particulate levels due to its much greater (3 times) population than Sudbury. The report states on page 3: "Sudbury, location of the largest nickel and copper smelting operation in the world, emits a daily tonnage of SO₂ which is more than twice that emitted within the whole city of New York. Even this level represents a great improvement over the situation during the years when many of the inhabitants were growing up there. According to constant monitoring by the Ontario Department of the Environment, the official pollution index in Sudbury frequently approaches the maximum permissible levels. During the two years of the survey it necessitated the shutdown of smelter operations on 22 occasions. Shutdown occurs when the index, which is scaled from 1 to 100, reaches 100, corresponding either to a level of 0.30 ppm of SO₂ over a 24-hour period or to approximately 600

micrograms of suspended particulate matter per cubic meter. There has been no occasion when the measured levels in Ottawa reached the point at which an industrial shutdown order could be issued."

Continuing our review, and focusing particularly on short-term levels, an examination of Tables 3 and 4 presenting CoH values for 1971 and 1972 respectively, shows the 1-hour maximum in 1971 to be 5.0 for Falconbridge (Sudbury) and 4.0 for Ash Street (Sudbury) compared with 2.8 for Ottawa; the 1972 values are 2.7 for Falconbridge and 2.8 for Lisgar Street (Sudbury) compared with 2.2 for Ottawa.

In 1971, the 1-hour maximum for SO₂ at the Happy Valley Station was 11428 ug/m³ with the other three stations reporting "lower" values of 3428 ug/m³, 4114 ug/m³ and 5257 ug/m³. As expected, the Happy Valley 1-hour readings exceeded the 1-hour criteria 378 times. The other Sudbury stations also frequently exceeded the 1-hour criteria. These stations also exceeded the 24-hour criteria frequently; the Happy Valley station exceeded the criteria on 50 occasions during 1971. The pattern of SO₂ values in Sudbury exceeding the criteria for 1-hour and 24-hour periods on numerous occasions persisted in 1972. There appears to be a failure of the authors to call proper attention to the peak values and their possible effects on the results. Were any attempts made to obtain spirometric tests of Sudbury residents during or shortly after one or more of these peak periods?

Incidentally, how were the particulate values obtained? Tables 3 and 4 discuss CoHs, whereas Table 7 uses suspended particulate matter -- presumably TSP. If the unit of measure is CoHs, how is this value translated into TSP?

Again, the concluding paragraph regarding pollution levels in the Neri et al. report entitled "Chronic Obstructive Pulmonary Disease in Two Cities of Contrasting Air Quality" is worth quoting. One wonders at the failure to include this in the final report. It follows: "It is acknowledged, however, that the comparison between these two cities might give an exaggerated impression of the effect of air pollution on health, if it were considered only in relation to recent exposure data. It is more likely that the respiratory differences noted in this study have developed over an extended period of time, during most of which the contrast in air quality was much harsher than it is today."

In the pilot study, the non-response rate was high. Accordingly, in the 1970 article in the Canadian Journal of Public Health, the statement is made that if "an arbitrary 10 percent" non-response rate is exceeded, a random sub-sample will be selected for this group for further study in order to secure some information about them. It would appear that this was not done. The 18% non-response rate in Ottawa apparently did not trigger a look at possible biases.

An examination of Appendix I indicates that though questions were asked on exposure to irritating gases or chemical fumes, these data were not analyzed. One wonders why.

Page 15 notes the apparently incorrect decision not to ask questions on education and income from the respondents but instead to rely on total city differences to make "broader comparisons" for average family income, educational achievement and percentage of French descent and French speaking households.

The use of three broad age groups, 15-24, 25-44, and 45-64, for age standardization appears to represent faulty demographic analysis. The authors correctly point out the inadequacy of their sample of the population 65-plus.

There appears to be an inconsistency in the Neri et al. report. On page 93, reference is made to problems with the population 65-plus and the lack of a "satisfactory match between the Ottawa and the Sudbury samples." Then, page 94 notes the "relatively minor differences" between the Sudbury and Ottawa samples in respect of distribution by age and by smoking habits.

Why does Figure 7 combine ages 15-24 and 25-44, and then 45-64 and 65-plus? Was this done to get appropriate consistent results? Compare this graph with Figure 2 on page 55.

The difference in chronic bronchitis prevalence rates was the same for females in both cities, with the male rate being 10% for Sudbury and 7.4% for Ottawa. The age-specific prevalence rates for chronic bronchitics are of interest because there was a drop-off in the rate for those 65-plus for Sudbury. This anomaly doesn't necessarily represent a small sample size as the authors seem to state.

With regard to Table 8, my experience is with cigarette usage of 1/2 pack, 1 pack, 1-2 packs, etc. I am not accustomed to the intervals shown here. The excess of Sudbury male cigarette smokers over Ottawa, particularly for "heavy" smokers, should be noted. I wonder why sex by age was not shown in this table instead of showing sex and age separately.

Figure 2 is disturbing. How does one get the intervals 1-10 cigarettes, 11 cigarettes-1 package, 1 package-plus from the collected groupings?

The cigarette smoking data in Figure 4 seems to be questionable. It is difficult for me to accept that the chronic bronchitis rate for heavy smokers is higher in Ottawa than in Sudbury. Given this finding, I may be tempted to question the results.

The support for the statement on page 31 that "In Sudbury light smokers appear to have rates closer to the heavy smokers than is the case in Ottawa, possibly suggesting that any amount of smoking

may be dangerous in the presence of air pollution or occupational exposure to respiratory irritants" appears to be lacking.

With regard to Table 13, does the category "smokers" include cigars and pipes? Why are the data not shown by number of cigarettes?

With regard to occupational exposure, the authors note on page 17 that 1/2 of the Sudbury males had worked for 1 year or more in a "risky" occupation, i.e. mining or a dusty occupation, compared to 1/5 of the Ottawa males. This is a striking difference and one which may not have been adequately covered.

The article contains this striking statement about occupational exposure to smelting or mining or other "dusty trades": "More evidence concerning possible occupational effects in Sudbury should emerge from data now being analysed by the Ontario Ministry of Health using a finer breakdown than is provided by the MRC classifications referred to above, in which sub-groups have been defined on the basis of occupational exposure to sulphur dioxide." It is difficult for this reviewer to believe this attempt to obtain additional evidence on the effects of occupational exposure in Sudbury by examining occupational exposure only to sulfur dioxide (rather than other agents likely to be more harmful) will add much, as compared with the influence of other possible factors, such as ethnicity.

Thus, if ethnicity is significant, why not an analysis by national origin (see Table 2)? The explanation for the higher death rates for first generation immigrants to Ontario (more in Sudbury) as due to "differences in smoking habits" is unpersuasive. Did the authors make any effort to learn anything about the large proportion of immigrants in Sudbury or the significance of the higher proportion of French in Sudbury?

It is of interest that the authors are aware of the possibility of a greater bias in reporting subjective symptoms constituting bronchitis in Sudbury than in Ottawa. They note the 10% who have a doctor diagnosis of chest disease with no symptoms reported in Ottawa as compared with 6% in Sudbury. I must emphasize their statement that "some caution is recommended in the interpretation of these findings."

For these and other reasons, it is my belief that this very worthwhile study can make no contribution to the development of scientific air quality criteria.

Conclusion

I hope that this brief review will have indicated some of the problems in conducting air pollution health effects research. In any case, it is my strong belief that the past quarter-century has witnessed a marked reduction in the "reducing" type of air pollution in most of England and North America.

Accordingly, for the United States at least, today may represent an opportune time to consider the recommendation of Dr. Ferris (of Harvard University) of September 20 in Atlanta, Georgia, that for health effects, the air quality standards for total suspended particulates and for sulfur dioxide could be relaxed. If this were done, one should be prepared to monitor the resulting pollutant values and morbidity to confirm the expected lack of adverse effects.

What he may have had in mind was the consequence of possibly unduly stringent controls. Returning to the newspaper article on the closed Youngstown Sheet and Tube Company mill, which I used to start my talk, another resident said: "That huge structure that is rusting is a precipitator, part of the EPA rules that cleaned the air. . . . They used to have billowing clouds of rust-colored smoke before the precipitator was put in here. Now you see nothing. . . . They can say all they want to, but the government restrictions on the steel industry, and the EPA with some of their ridiculous rules, don't look too good to somebody that doesn't have a job."

I should like to conclude by stating that those of us who have been involved in the early health effects research had as our objective ultimately to determine whether or not a cause-and-effect relationship exists between known dosages of air pollutants, singly or in combination, and the health or welfare of man under known environmental conditions. Twenty-five years later, it is not likely that this will be wholly accomplished within the near future.

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